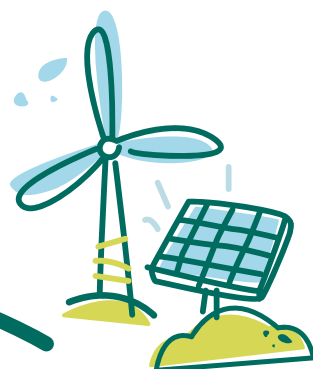




Remote area Energy supply with Multiple Options for  
**integrated hydrogen-based TEchnologies**



Among renewable energies, the most important source in the eu-28 was biomass - solid biofuels - and renewable waste like biogas accounting for about two thirds (65.1%) of the total. Hydropower was the other main contributor to the renewable energy mix (16.2% of the total). New renewables like solar and wind accounted respectively for 3.5% and 10.3% of the total. Hence, the scene is still much dominated by conventional renewables. However, to meet post-2020 targets, the penetration of “new” renewables like solar and wind is required. These sources have a higher power density than biomass, so they could better fit our needs. However, the issue of intermittency has to be solved and one significant option is developing bulk energy storage solutions for electricity that are cost-effective, energy dense, reliable. In the case of isolated micro-grid or off-grid remote areas, the business case of energy storage is different, as the network is essentially non-existent or there is the interest of managing the local network in an independent way. Therefore, energy storage is a game changer. Intermittent Renewable Energy Source (RES) – PV, wind, wave – integrated with an H2-based power-to-power (P2P) storage system can provide a viable, reliable, cost- effective, and decarbonized alternative to on-site electricity generation through diesel engines.

## Demos' Locations

### Europe map

#### + The Project

REMOTE has the objective to demonstrate the technical and economic feasibility of two H<sub>2</sub>-based H<sub>2</sub> energy storage solutions (one integrated P2P system and one non-integrated P2G+G2P system). Four DEMO sites supplied by renewable electricity will be installed in either isolated micro-grids or off-grid remote areas.

In the high-renewables EU scenario (60% and more of variable RES penetration by 2050), there will be economic potential for very large amounts (up to 10 times the currently installed capacity, or about 400 GW in the EU) of power-to-power (P2P) storage for the integration of intermittent renewables.

Experience gained in isolated and off-grid remote areas will pave the way for the deployment of fuel cell and H<sub>2</sub>-based storage solution at large scale.

#### + Demo Sites

The four DEMO sites have been chosen to obtain a mix of different renewable sources tested in different contexts from the sunny and hot southern Europe up to the windy and cold Scandinavia or the specific climate of Italian Alps. To provide reliable and clean energy to local population is a technical challenge with a strong social impact as cheaper, available and green energy is one of the basic brick for economic development. All the sites will experience an almost complete substitution of fossil fuels (with some of them reaching zero need for fossil fuel).







## A. DEMO1

### Ginostra - (Stromboli Island, Italy)

- Off-grid configuration
- RES based on PhotoVoltaics (PV) generators;
- Residential loads available on-site;
- P2P system manufacturer: Electro Power Systems;
- End-user: ENEL Green Power, utility.



## B. DEMO2

### Agkistro – (Greece)

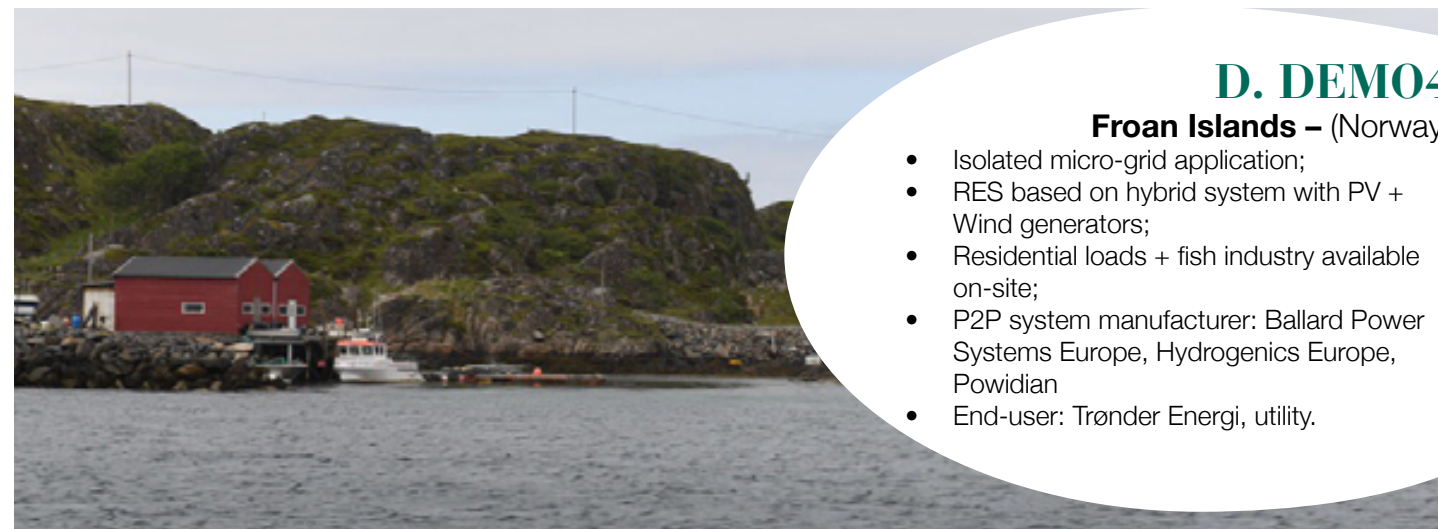
- Isolated micro-grid, outback isolated area; RES based on hydro generators;
- Industrial loads available on-site;
- P2P system manufacturer: Electro Power Systems;
- End-user: Horizon S.A., owner of the hydro plant.



## C. DEMO3

### Ambornetti – (North of Italy)

- Off-grid configuration (Alps);
- RES based on hybrid system with PV and a biomass CHP generators;
- Residential loads available on-site;
- P2P system manufacturer: Electro Power Systems;
- End-user: IRIS srl, stakeholder of the hamlet.



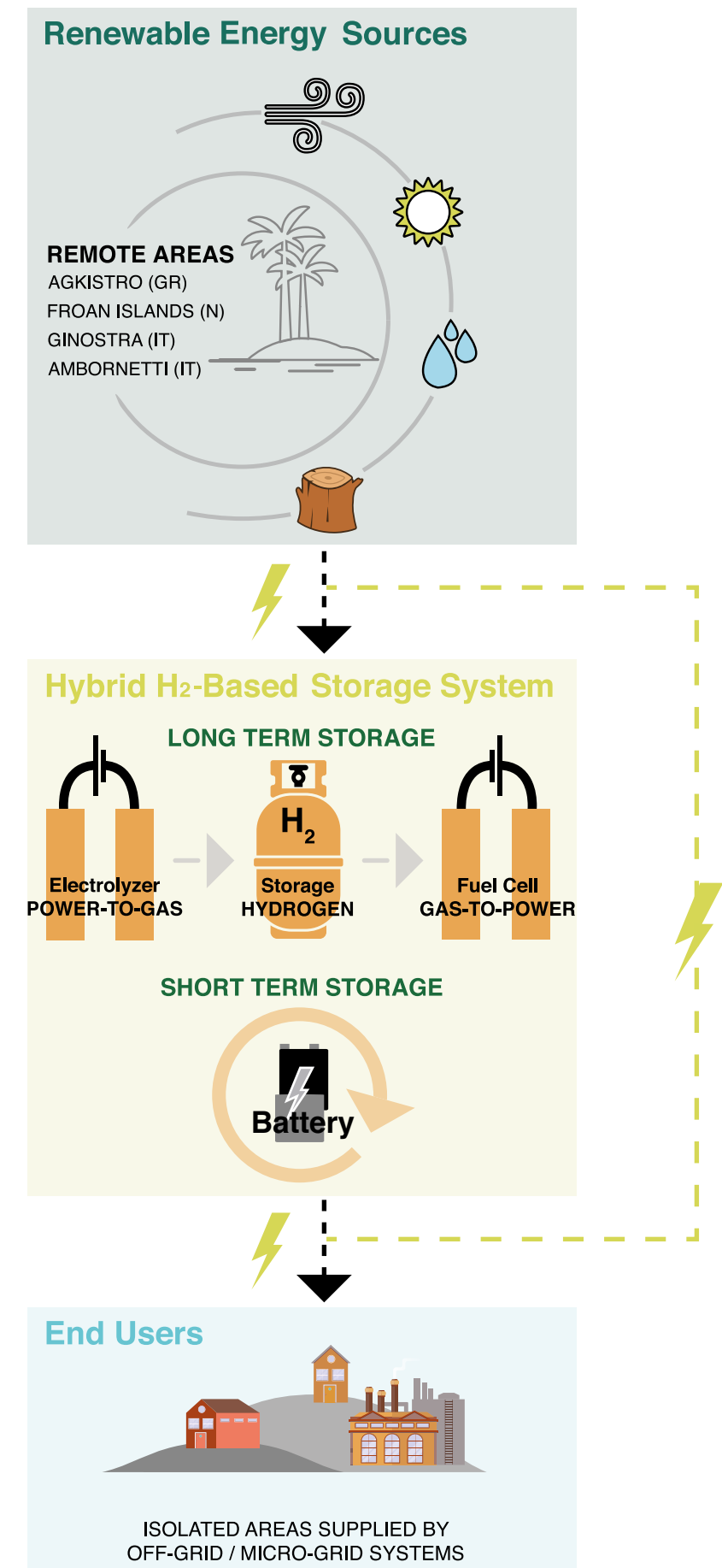
## D. DEMO4

### Froan Islands – (Norway)

- Isolated micro-grid application;
- RES based on hybrid system with PV + Wind generators;
- Residential loads + fish industry available on-site;
- P2P system manufacturer: Ballard Power Systems Europe, Hydrogenics Europe, Powidian
- End-user: Trønder Energi, utility.

## + The process

Remote area Energy supply with Multiple Options for integrated hydrogen-based TEchnologies - is a 4-year project (2018-2021) with a budget of EUR 6.76 million, granted EUR 4.99 million under the EU's Horizon 2020 programme.



## **+ PARTNERS**

The project coordinated by Politecnico di Torino (IT) has the following partners: Ballard Power Systems Europe (DK), Hydrogenics Europe (BE), Powidian (FR), Enel Green Power (IT), Orizwn (EL), IRIS (IT), Tronderenergi (N), SINTEF (N), EPS ELVI Energy (IT), CERTH - Ethniko Kentro Erevnas Kai Technologikis Anaptyxis (GR).

## **official website**

<https://www.remote-euproject.eu/>

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